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2. Patent application number
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3. Full name, address and postcode of the or of each applicant (underline all surnames)
John Hancock
5 Periwinkle Lane
HITCHIN
Hertfordshire SG5 1TY
United Kingdom

Patents ADP number (if you know it)

If the applicant is a corporate body, give the country/state of its incorporation

867122001

4. Title of the invention A Roller

5. Name of your agent (if you have one) W. P. Thompson & Co.

"Address for service" in the United Kingdom to which all correspondence should be sent (including the postcode)

Eastcheap House, Central Approach
Letchworth
Herts SG6 3DS

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Priority documents

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Statement of inventorship and right to grant of a patent (*Patents Form 7/77*)

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11. We request the grant of a patent on the basis of this application

Signature

W. F. Thompson & Co.
W. F. Thompson & Co.

Date

July 18, 2003

12. Name and daytime telephone number of person to contact in the United Kingdom
- Dr Gareth D Probert
01462 682139

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A ROLLER

THE PRESENT INVENTION relates to a roller, and more particularly to a roller capable of storing and dispensing a liquid.

Rollers have many uses and are often used to smooth or flatten areas such as a lawn. In order to effectively smooth or flatten the ground, such a roller must be of substantial weight. In addition to rollers of fixed weight, rollers have been proposed which may be filled with a liquid such as water in order to increase their effective weight.

In addition, it has been previously proposed to use such a water-filled roller as a container or reservoir of water to be transported to a particular location for dispensing the water. However, such proposed rollers often required external pumping means and other apparatus in order to be used in this way.

There have also been proposed sprayers for use around gardens. However, these are often bulky and weighty items which are not easily transported to desired locations.

It can be appreciated that there exist disadvantages with existing devices such as those discussed above.

The present invention seeks to provide an improved roller.

According to the present invention, there is provided a roller comprising a substantially cylindrical body and a handle pivotably attached to the body, the body comprising a chamber for containing a liquid, an outlet in fluid communication with the chamber and pump means for dispensing a liquid from the chamber through the outlet.

Preferably, the handle is detachable from the body.

Conveniently, the handle is attached to one end of the body.

Advantageously, one end of the roller is detachable.

Preferably, the detachable end cap comprises a handle

portion.

Conveniently, the body comprises a central shaft.

Advantageously, the roller further comprises means for compressing material stored within the chamber.

5 Preferably, the pump means extend through one end of the body substantially along the axis of the body.

Conveniently, the body comprises a second chamber located within the first chamber.

Advantageously, the roller further comprises a hose which
10 may be stored within the handle.

Preferably, the roller further comprises a plurality of spikes provided on the outer surface of the above.

Conveniently, the roller further comprises edging means attached to one end cap.

15 The present invention will now be described, by way of example, with reference to the accompanying drawings in which:

Figure 1 is a perspective view of a roller of the invention;

Figure 2 is a cross-sectional view of the roller
20 shown in figure 1;

Figure 3 is a further perspective view of the roller shown in figure 1;

Figure 4 is a partial perspective view of the handle
3 prior to attachment to the body 2;

25 Figure 5 is an exploded view of the handle 3 and body 2 shown in figure 4;

Figure 6 is a partial cross-sectional view of the attachment of the handle 3 to the body 2;

Figure 7 is a perspective view of a roller fitted
30 with a compression disc;

Figure 8 is a cross-sectional view of the roller shown in figure 7;

Figure 9 is a perspective view of a roller fitted with a small chamber;

35 Figure 10 is a cross-sectional view of the roller

shown in figure 9;

Figure 11 is a perspective view of a roller fitted with aerating spikes;

Figure 12 is a cross-sectional view of the roller 5 shown in figure 11;

Figure 13 is a perspective view of a roller fitted with an edging blade;

Figure 14 is a cross-sectional view of the roller shown in figure 13; and

10 Figure 15 is a side view of a roller fitted with an edging blade.

Turning to figure 1, a roller of the invention is shown generally at 1, comprising a substantially cylindrical body 2 and an attached handle 3. The body 2 comprises a tubular wall 4 which is connected to a first end cap 5 and a second end cap 6. The tubular wall 4 is constructed from a semi-transparent plastic material. In an alternative embodiment, the wall 4 may be manufactured from metal. A shaft 7 runs substantially along the axis of body 2 and connects the first 20 end cap 5 to the second end cap 6. The body 2 thus comprises a chamber 8 bounded by the tubular wall 4 and the first end cap 5 and the second end cap 6.

The handle 3 is substantially L-shaped and is releasably attached to the body 2 at a point substantially centrally 25 located on the second end cap 6. The handle 3 is capable of pivoting about the connection to the end cap 6, thus allowing the body to be rolled over the ground whilst pivoting about the connection with the handle 3.

As shown in figures 1, 2 and 3, the handle 3 comprises 30 three portions. The first portion 27 attaches the handle 3 to the body 2 and is discussed in more detail below.

When the handle 3 is attached to the body 2, the first portion 27 extends from a socket 28 in the second end cap 6, substantially along the axis of the body 2 for a short 35 distance away from the second end cap 6. From this end of the

first portion 27 of the handle 3 the second portion 9 extends substantially perpendicularly away from the first portion 27, i.e. in a direction radially away from the axis of the body 2, for a distance which is slightly longer than the overall 5 length of the body 2. The third portion 10 of the handle 3 extends substantially perpendicularly away from the end of the second portion 9, in a direction substantially coaxial with the axis of the body 2. The third portion 10 extends for a distance slightly longer than the length of body 2. The 10 handle 3 may be taken apart into several separate pieces for convenient storage within the body 2 when not in use. In use, a user may grasp the third portion 10 of the handle 3 in order to trundle the body 2 along the ground.

The body 2 is provided with a pump 11, the operation of 15 which will be discussed in detail below. Briefly, the pump 11 comprises a handle 12 located externally of the chamber 8 and which extends through the first end cap 5 into a pump mechanism 13 located within the shaft 7.

Turning to figure 2, a cross-section of the roller 1 20 along the plane defined by the handle 3 and the central shaft 7 is shown.

The pump 11 comprises the external handle 12 which is connected to the pump mechanism 13 positioned within the hollow shaft 7. The pump mechanism 13 is shorter than the 25 shaft 7 giving a free volume within the end of shaft 7. This area of the shaft 7 is provided with a series of apertures 14 which provide fluid communication between the volume within the shaft 7 and the chamber 8. In use, the handle 12 is pushed towards the body 2 and twisted anticlockwise to unlock 30 it from a locked state. The pump handle 12 may then be moved repeatedly away from and towards the body 2 in order to pump air through the pump mechanism 13 into the free space at the end of the shaft 7, through the apertures 14 and into the chamber 8. The pump 11 may thus be used to pressurise the 35 contents of the chamber 8. For safety purposes there is a

pressure valve 15 which releases excess pressure if the chamber 8 is pressurised above a pre-determined level, such as 45 psi (3 bar). The pressure valve 15 is located in the first end cap 5. There is also provided an outlet 16 in the first end cap 5 which allows fluid to be dispensed from the chamber 8. The pump 11 is located centrally through an aperture in the first end cap 5 and the valve 15 and outlet 16 are located diametrically about the pump 11.

A spray 17 may be connected to the outlet 16 for convenient dispensing of a liquid from within the chamber 8. As shown, the various components of the spray 17 may be conveniently stored within the handle 3. To retrieve the spray 17 from this stored state, the third portion 10 may be removed from the remainder of the handle 3 to expose the lance 21. The spray 17 may then be pulled out and the third portion 10 replaced on the remainder of the handle 3. This process may be reversed in order to store the spray 17 within the handle 3 after use.

The spray 17 comprises three major portions. The first portion is for insertion through the outlet 16 and into the chamber 8 and comprises an elongate tube 18 of plastic material which is provided with a weighted filter 19 at its free end. At the other end of the tube 18 there is provided attachment means 20 which engage with the outlet 16 in a liquid-tight manner. In use, the tube 18 is inserted through the outlet 16 into the chamber 8 and is attached by screwing the attachment means 20 onto the outlet 16. The weighted filter 19 ensures that the open end of the tube 18 is located towards the bottom of the chamber 8, with the filter preventing particulate matter from passing into the tube 18 and blocking the spray 17.

The second portion of the spray 17 is a length of flexible plastic hose 21 which is stored in a coiled state when the spray 17 is located within the handle 3. The hose 21 is connected to the tube 18 through the attachment means

20. The hose 21 leads to the third portion of the spray 17 which is a lance 22. The lance 22 comprises a telescopic section 23 leading to an adjustable spray head 24. The lance 22 comprises two trigger switches 25 and 26 which control the flow of liquid through the spray 17. The first trigger 25 allows fluid to flow through the spray 17 only whilst being depressed by the user and automatically shuts off the flow of fluid when pressure on the trigger 25 is released. In contrast, the second trigger 26 may be toggled between an open position, allowing fluid flow through the spray 17, and a closed position. The user may toggle this switch 24 into the open position to allow fluid flow without having to continually depress the switch.

In order to use the roller 1 as a liquid dispensing device, the handle 12 of the pump 11 is twisted anticlockwise without initially depressing the handle in order to unscrew and detach the whole pump means 11 from the body 2. Liquid may then be conveniently poured through the opening left by the removal of the pump 11 into the hollow shaft 7 and then through the apertures 14 into the chamber 8. Once a sufficient level of liquid has been reached, the pump 11 is then reinserted into the aperture in the first end cap 5 of the body 2. The handle 12 is then depressed and turned anticlockwise in order to release it for pumping.

Repeated reciprocal movement of the handle 12 forces air into the chamber 8 as described above. This pressurises the contents of chamber 8 ready for dispensing the liquid. The spray 17 may then be used by depressing one of the triggers 25 and 26 to allow pressurised liquid inside the chamber 8 to be expelled through tube 18 via outlet 16 along the spray 17 and out of the spray head 24. Once the chamber 8 is emptied of liquid, or if no more liquid needs to be dispensed, the pressure valve may be activated to release excess pressure. The pump 11 may then be removed in order to empty any remaining liquid from the chamber 8. The spray 17 may be

removed from the outlet 16 and replaced within the handle 3.

In addition to dispensing water, the roller 1 may also be used to transport and dispense other liquids, such as pesticides, herbicides or fertilisers, and also liquids such as wood/shed treatments such as water-proofing agents or preservatives.

The handle 3 may be reversibly detached from the body 2 as described below with reference to figures 3, 4, 5 and 6. As figure 3 shows, the first portion 27 may be received within a socket 28 located centrally on the external face of the second end cap 6. On the external face of the second end cap 6 there is also provided a handle 37, the purpose of which will be discussed below.

As shown in figure 4, the first portion 27 of the handle 3 comprises a locking mechanism 30 which allows the handle to be securely attached to the body 2 and which permits easy detachment of the handle 3 by the user. As described below, the handle 3 may be removed from the body 2 by depression of a pair of buttons 29 located on the first portion 27.

Figure 4 shows the first portion 27 of the handle 3 removed from the socket 28 of the body 2. The locking mechanism 30 extends from the end of the first portion 27 and is adapted to be received within the socket 28.

Figure 5 shows the components of the locking mechanism 30 in an exploded state for clarity. The mechanism 30 comprises three components 31, 33 and 34 which are mounted on a shaft 35 which extends from the end of the first portion 27 of the handle 3. The first portion 31 of the locking mechanism 30 comprises a pair of fingers having a stepped shape. The fingers are shaped to form terminal locking portions 32 which are connected to the two release buttons 29 at the other ends.

The second portion 33 of the mechanism 30 is a compression spring in the shape of a strip folded into a "double-S" shape. The outer arms of the spring 33 attach to

the inner surface of the fingers 31. The central portion of the spring 33 is received within a slot in the shaft 35. The portion 34 has a substantially cylindrical shape with notches adapted to receive the spring 33. Spring 33 is received 5 within portion 34 and also holds the fingers 31 in place, all of which is mounted on shaft 35 extending from the end of the first portion 27 of handle 3. The third portion 34 of the mechanism 30 engages with the fingers 31, spring 33 and the shaft 35 to hold the components of the mechanism 30 together. 10 By moving the release buttons 29 towards each other, the whole component 31 flexes, bringing the locking portions 32 towards each other.

The three components of the locking mechanism 30 act together to provide a resilient bias to maintain or return 15 the locking portions 32 to their normal radially extended positions.

The locking portions 32 have a chamfered edge to facilitate the easy insertion of the mechanism 30 into the socket 28. Figure 6 shows the situation once the handle 3 is 20 attached to the body 2. The interior of the socket 28 has a section 36 of increased diameter positioned away from its entrance. The section 36 is adapted to receive the locking portions 32 of the mechanism 30. As the mechanism 30 is inserted into the socket, the locking portions 32 are 25 compressed towards each other allowing the mechanism 30 to be fully inserted into the socket 28. Once the locking portions 32 reach the section 36, they expand to their normal radially extended positions, allowing secure abutment of their surfaces with the surfaces of section 36. This ensures a tight fit 30 between the handle 3 and the body 2.

To remove the handle 3, the user clutches and squeezes the release buttons 29 towards each other. This brings the locking portions 32 towards each other, allowing the mechanism 30 to be withdrawn from the socket 28.

35 Figure 7 shows a further use of the roller 1 of the

invention as a container for other materials, such as garden waste.

As discussed above, the body 2 comprises a tubular wall 4 capped by a first end cap 5 and a second end cap 6 which are 5 connected together via a shaft 7 running substantially along the axis of the body 2. The second end cap 6 may be unscrewed from the shaft 7 and removed from the body 2. This may be achieved by removing the handle 3 from the second end cap 6 as described above, and then unscrewing the end cap 6 from the 10 shaft 7 by turning the handle 37. The walls of the second end cap 6 are provided with apertures 40 for its use as a container. Once removed from the body 2, the end cap 6 may be carried around by the apertures 40 and used as a receptacle for various objects and material. The compression disk 38, 15 which will be described below, can serve as a lid for the end cap 6 when removed from the roller 1.

Removal of the second end cap 6 leaves a large aperture at the end of the body 2 which allows material to be placed into the chamber 8. This material may comprise grass cuttings 20 or other garden refuse. Such material tends to be bulky with a relatively low density. The body 2 may thus be used a storage or transporting container for such material. In order to make efficient use of the chamber 8, material may be placed into the chamber 8 and then compressed, allowing more material 25 to be added. This is achieved by screwing a compression disk 38 onto the threaded shaft 7. The compression disk 38 is of substantially planar configuration having a central aperture adapted to receive the screw-threaded shaft 7. Towards the periphery of one face of the compression disk 38 there is 30 located a handle 39 for turning the disk about the shaft 7 in order to move the disk 38 along the shaft 7 as desired. Turning the disk by use of the handle 39 allows the disk to be moved towards the first end cap 5, thus effectively compressing the waste. The disk may then be unscrewed from 35 the shaft 7 in order to allow more material to be added. In

an alternative embodiment, the compression disk 38 may be adapted to be released from the screw thread of shaft 7 in order to rapidly slide the disk 38 to a desired location before engaging with the screw thread.

5 Figure 8 is a cross-sectional view corresponding to figure 7 along the plane defined by the handle 3 and the shaft 7. The arrangement of the compression disk 38 on the shaft 7 can easily be seen.

As mentioned above, the chamber 8 defines a volume of 10 around 100 litres. In many instances, it would be preferable to have a chamber of smaller volume, for example of around 30 litres. As illustrated in figure 9, this can be achieved by the use of a second tubular wall 41. The second end cap 6 may be unscrewed from the shaft 7 to allow the second tubular wall 15 41 to be inserted into the body 2, and arranged substantially concentric with the tubular wall 4, coaxial with the shaft 7. The second end cap 6 may then be screwed back onto the shaft 7. The ends of the second tubular wall 41 are then pressed against the internal surfaces of the first and second end caps 20 in a liquid type manner. This is achieved by a first circular seal 43 and a second circular seal 44 on the first end cap 5 and second end cap 6 respectively. Screwing the second end cap 6 onto the shaft 7 ensures that the second tubular wall 41 is seated against the first and second seals 43 and 44 in 25 a liquid type manner.

The volume within the second tubular wall 41 and the first and second end caps 5 and 6 thus defines a second chamber 42 of around 30 litres. As shown in figure 10, the second tubular wall 41 is located radially beyond the outlet 30 16 and the pressure valve 15, located in the first end cap 5. The pump 11 may be used to pressurise the second chamber 42 and its contents while still allowing use of the pressure valve 15 and the outlet 16. The spray 17 may be connected to the body 2 via the outlet 16 in the manner described above.

35 In addition to using the second chamber 42 as a

pressurised container for liquid, it may also be used to contain a smaller volume of liquid than the first chamber 8 for use as a "rolling" weight only. This has advantages in preventing "sloshing" of a small amount of liquid in the larger first chamber 8 and also in that fewer pumps of the pump mechanism are needed to pressurise a smaller volume of liquid.

Aeration of ground may be performed to enhance and improve its properties. This may be done by inserting hollow spikes or tines into the ground in order to reduce compaction. The use of the roller 1 as an aerator is demonstrated in figure 11. The body 2 of the roller 1 is provided with three circumferential hoops 45 each provided with a plurality of radially projecting spikes 46. The hoops 45 each comprise a plurality of arcuate segments which may be placed around the external surface of the tubular wall 4 and connected together to give a complete hoop 45. The spikes 46 extend radially outwards from the hoops 31. In alternative embodiments, the spikes 46 may be shorter and/or hollow.

Figure 12 is a cross-sectional view of the roller 1 shown in figure 11 along the plane defined by the handle 3 and the shaft 7. The roller 1 may be trundled along the ground with the spikes 46 being brought into contact with the ground as the body 2 rolls along. The chamber 8 or the second chamber 42 may be filled with liquid in order to ease the insertion of the spikes 46 into the ground.

A further use of the roller 1 is shown in figures 13, 14 and 15. In this use, the pump 11 has been removed from the first end cap 5 and an edger 47 inserted in its place. The edger 47 comprises attachment means 48 which is inserted into the central aperture in the first end cap 5 left by removal of the pump 11. An arcuate arm 49 leads from the attachment means 48 to a position axially beyond the first end cap 5. A circular blade 50 is pivotally attached to the end of the arm 49. The blade 50 is provided with a shield 51 which

covers the upper half of the blade 50. The position of the blade 50 relative to the body 2 may be adjusted to suit the cutting required. The edger 47 is rotatably attached to the body 2 by the attachment means 48.

5 In use, the roller 1 may be trundled along the ground with the blade 50 adjusted in order to cut the edge of a lawn.

Figure 14 is a cross-sectional view of the roller shown in figure 13 along the plane defined by the handle 3 and the shaft 7. A rotatable guide wheel 52 is provided at the end
10 of arm 49, located on the opposite face of the arm 49 from the blade 50. The guide wheel 52 sits on the surface of the ground whilst blade 50 cuts into the ground.

Figure 15 shows the roller 1 and edger 47 in use being trundled along the ground. The blade 50 cuts into the ground
15 ahead of the body 2 of the roller. The weight of the roller 2 (and liquid contained therein) and the force provided by the user pushing on the handle 3 ensure that the blade 50 cuts into the ground as shown. In alternative embodiments, the guide wheel 52 may be omitted, and/or the rotating blade 50
20 may be replaced with a non-rotating blade.

CLAIMS

1. A roller comprising a substantially cylindrical body and a handle pivotably attached to the body, the body
5 comprising a chamber for containing a liquid, an outlet in fluid communication with the chamber and pump means for dispensing a liquid from the chamber through the outlet.

2. A roller according to claim 1 wherein the handle is detachable from the body.

10 3. A roller according to claim 1 or 2 wherein the handle is attached to one end of the body.

4. A roller according to any of claims 1, 2 or 3 wherein one end of the roller is detachable.

5. A roller according to claim 4 wherein the detachable
15 end cap comprises a handle portion.

6. A roller according to any of the preceding claims wherein the body comprises a central shaft.

7. A roller according to any of the preceding claims further comprising means for compressing material stored
20 within the chamber.

8. A roller according to any of the preceding claims wherein the pump means extend through one end of the body substantially along the axis of the body.

9. A roller according to any of the preceding claims
25 wherein the body comprises a second chamber located within the first chamber.

10. A roller according to any of the preceding claims further comprising a hose which may be stored within the handle.

30 11. A roller according to any of the preceding claims further comprising a plurality of spikes provided on the outer surface of the above.

12. A roller according to any of the preceding claims further comprising edging means attached to one end cap.

35 13. A roller initially as hereinbefore described with

reference to and/or shown in the accompanying drawings.

ABSTRACT

A ROLLER

5 A roller comprising a substantially cylindrical body and a
handle pivotably attached to the body, the body comprising a
chamber for containing a liquid, an outlet in fluid
communication with the chamber and pump means for dispensing
a liquid from the chamber through the outlet. Preferably the
10 handle is attached to one end of the body, and is detachable
therefrom. One end cap may be detached from the body.

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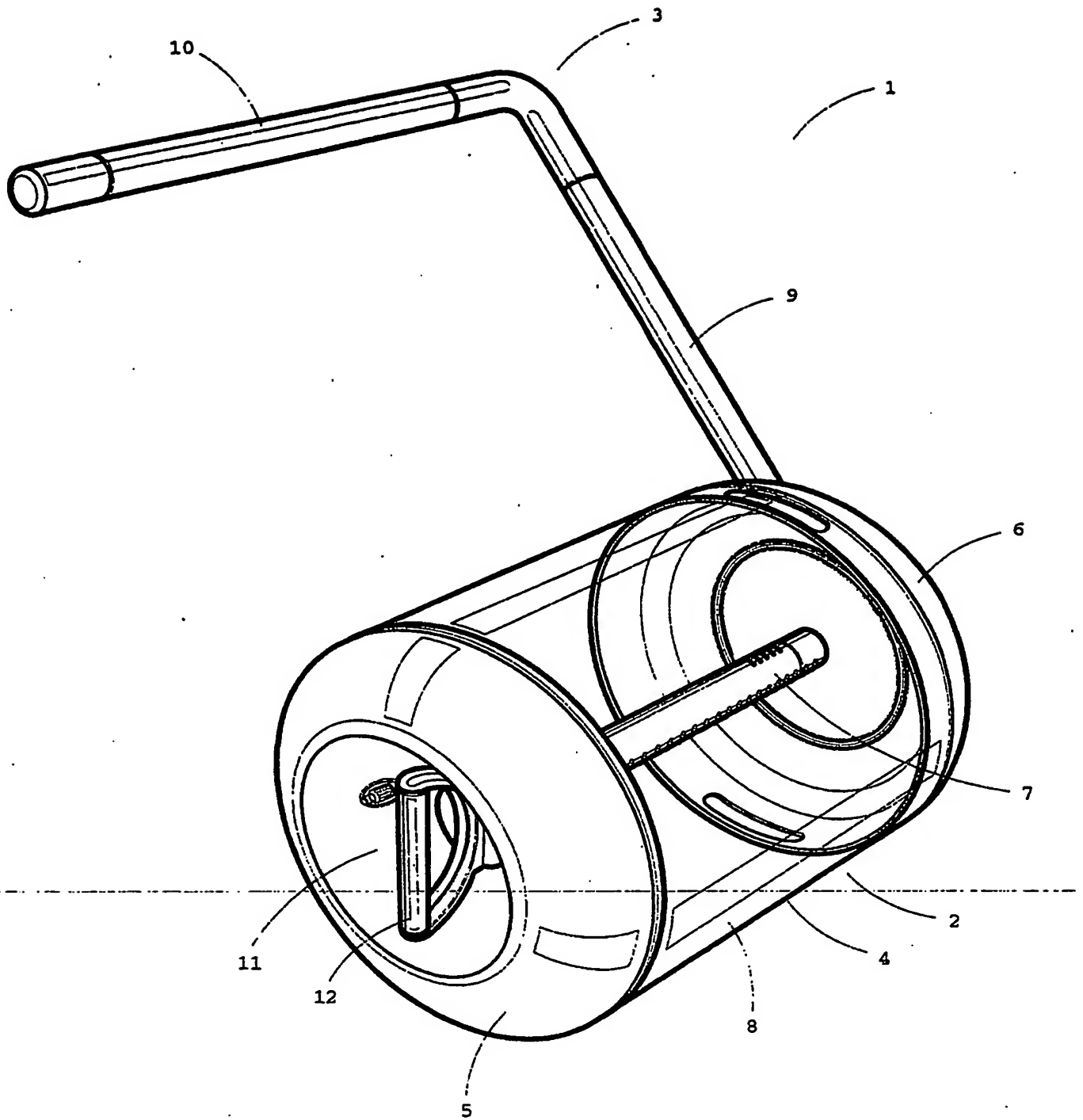


Figure 1

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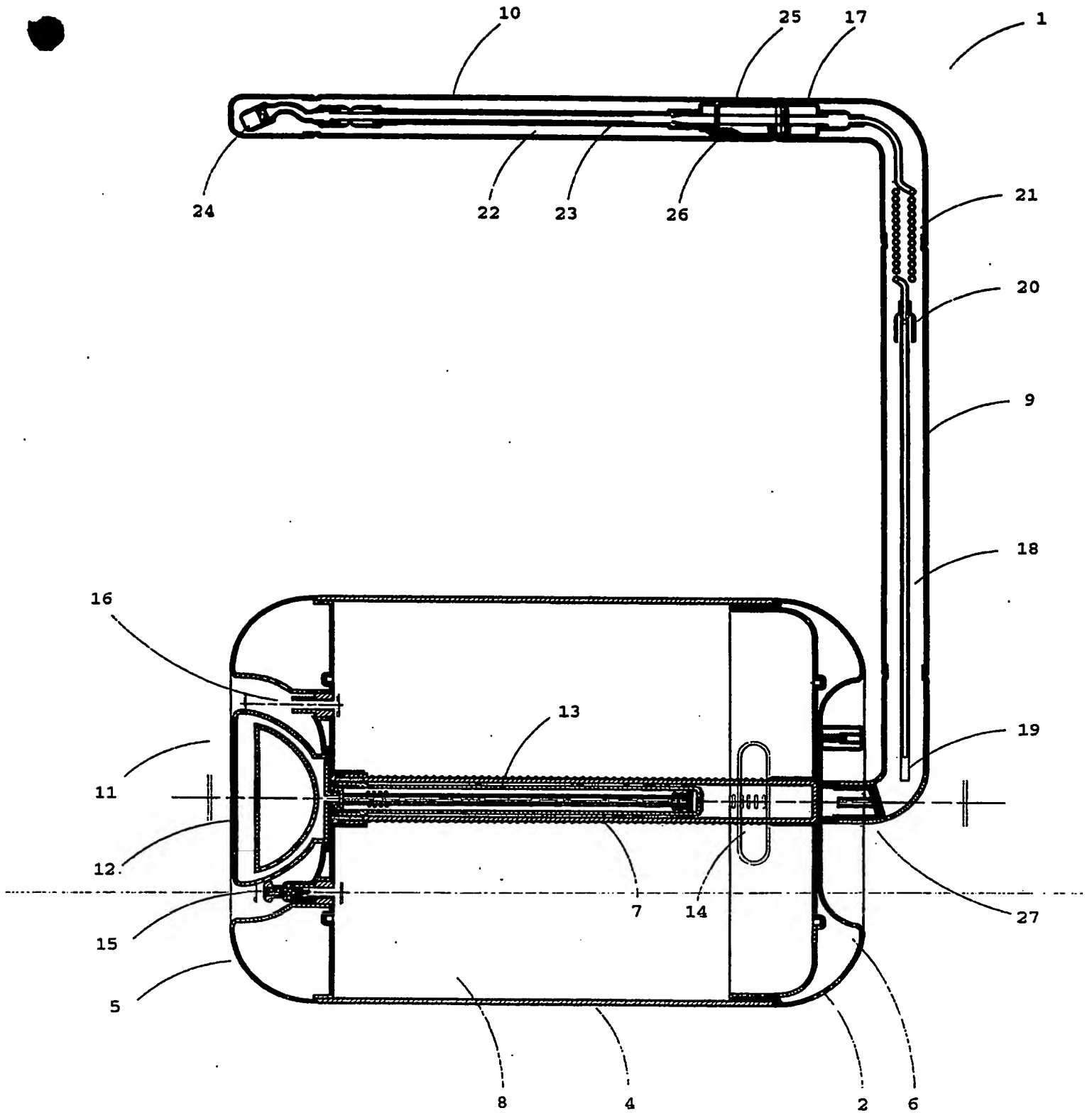


Figure 2

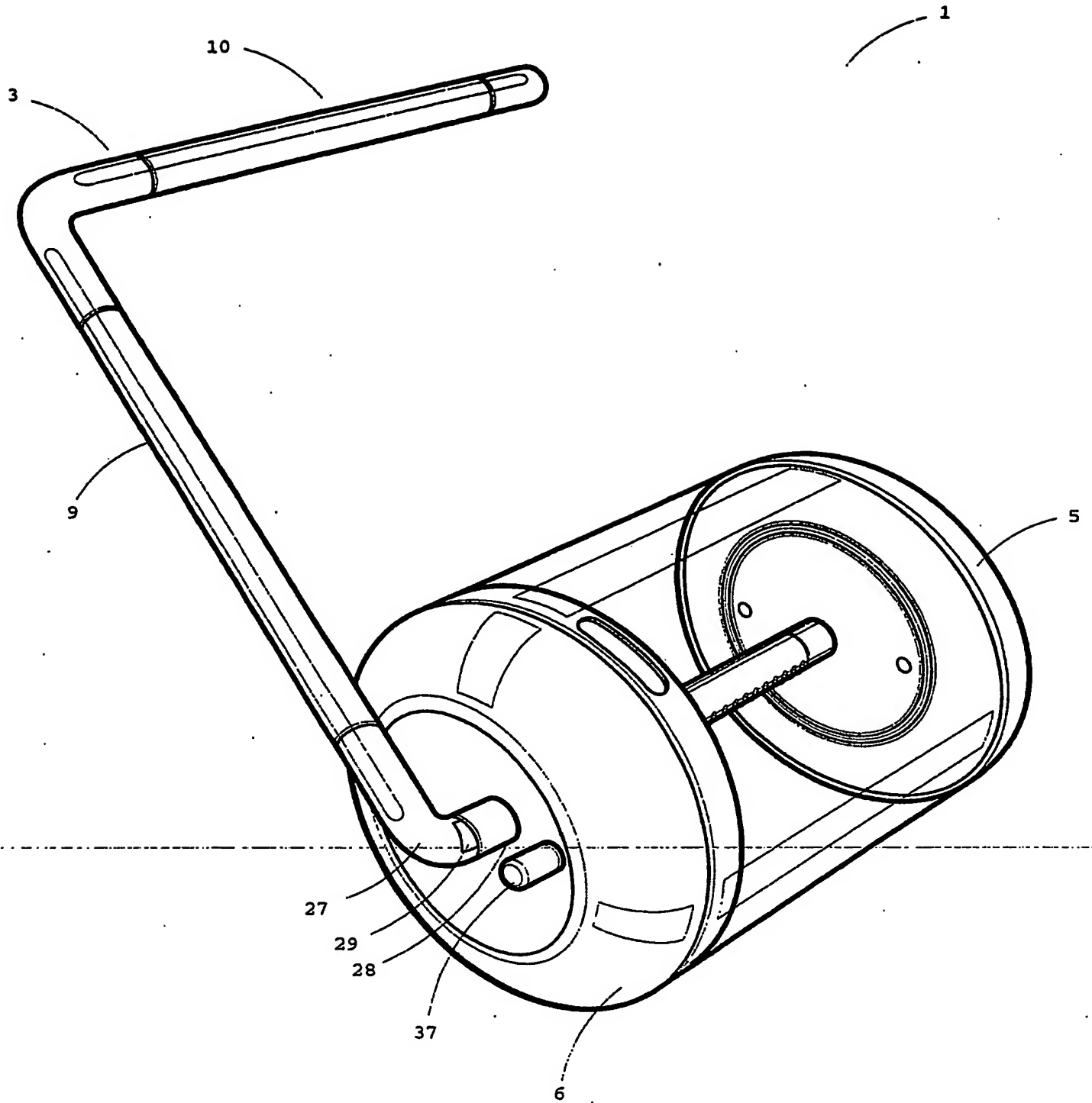


Figure 3

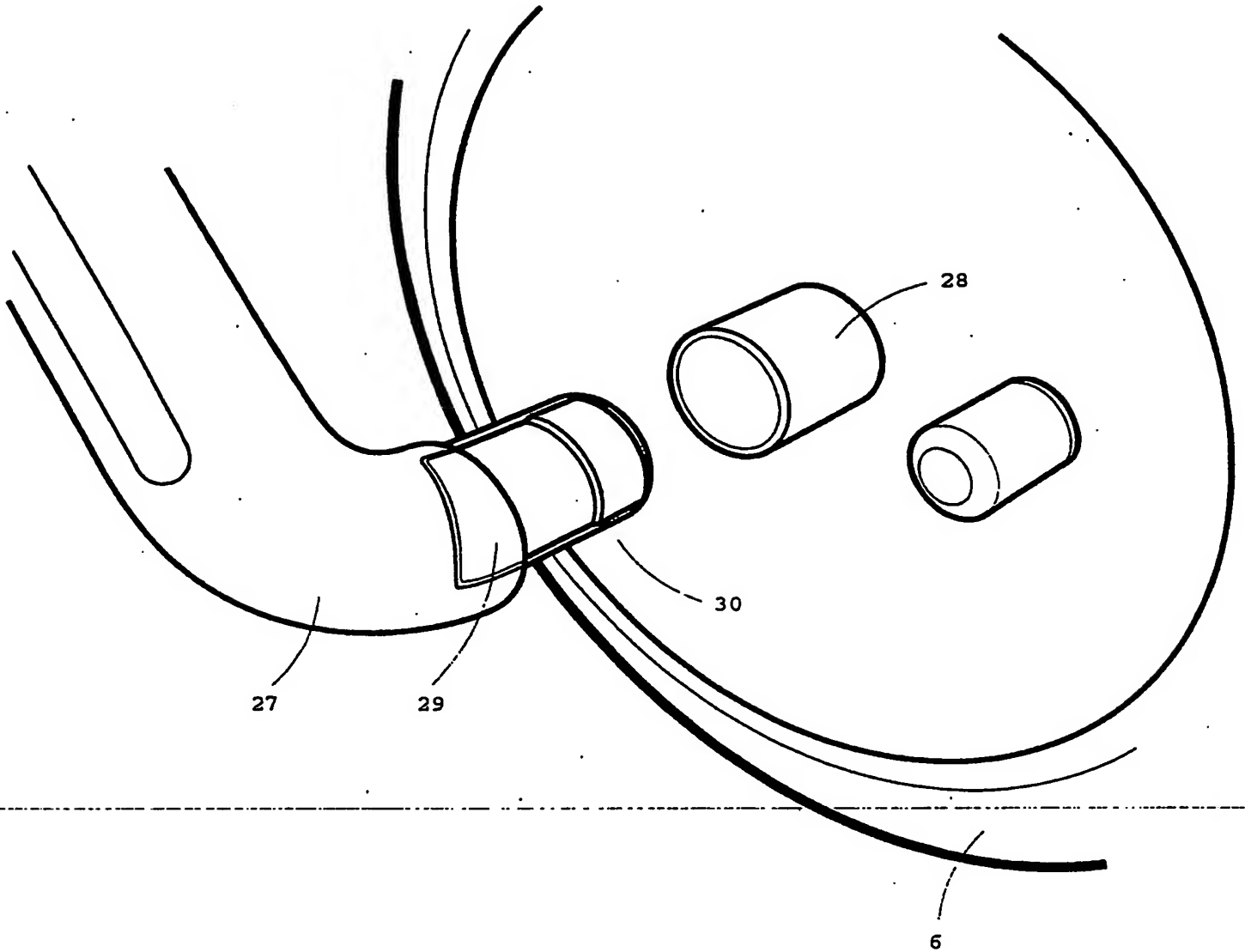


Figure 4

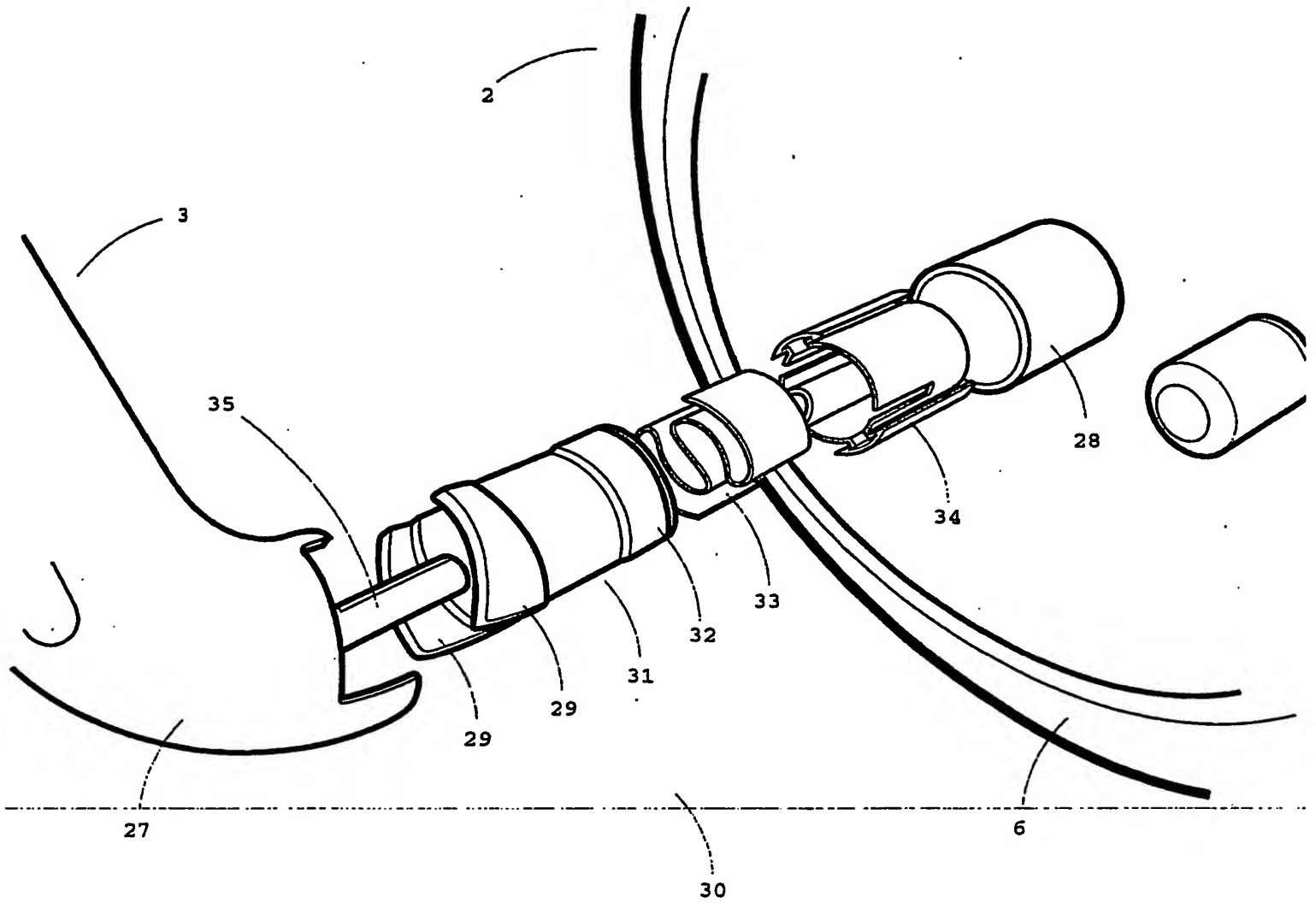


Figure 5

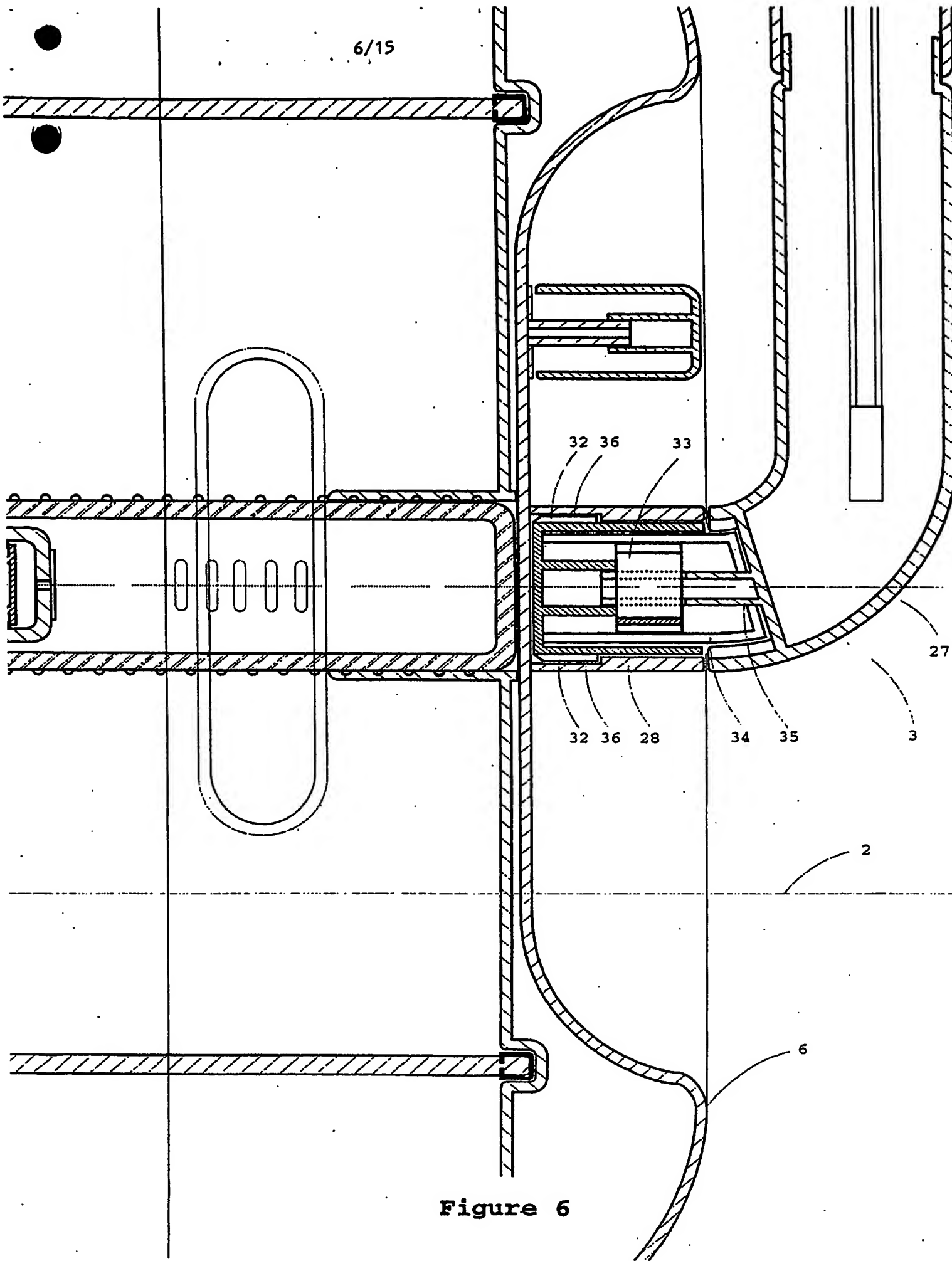


Figure 6

7/15

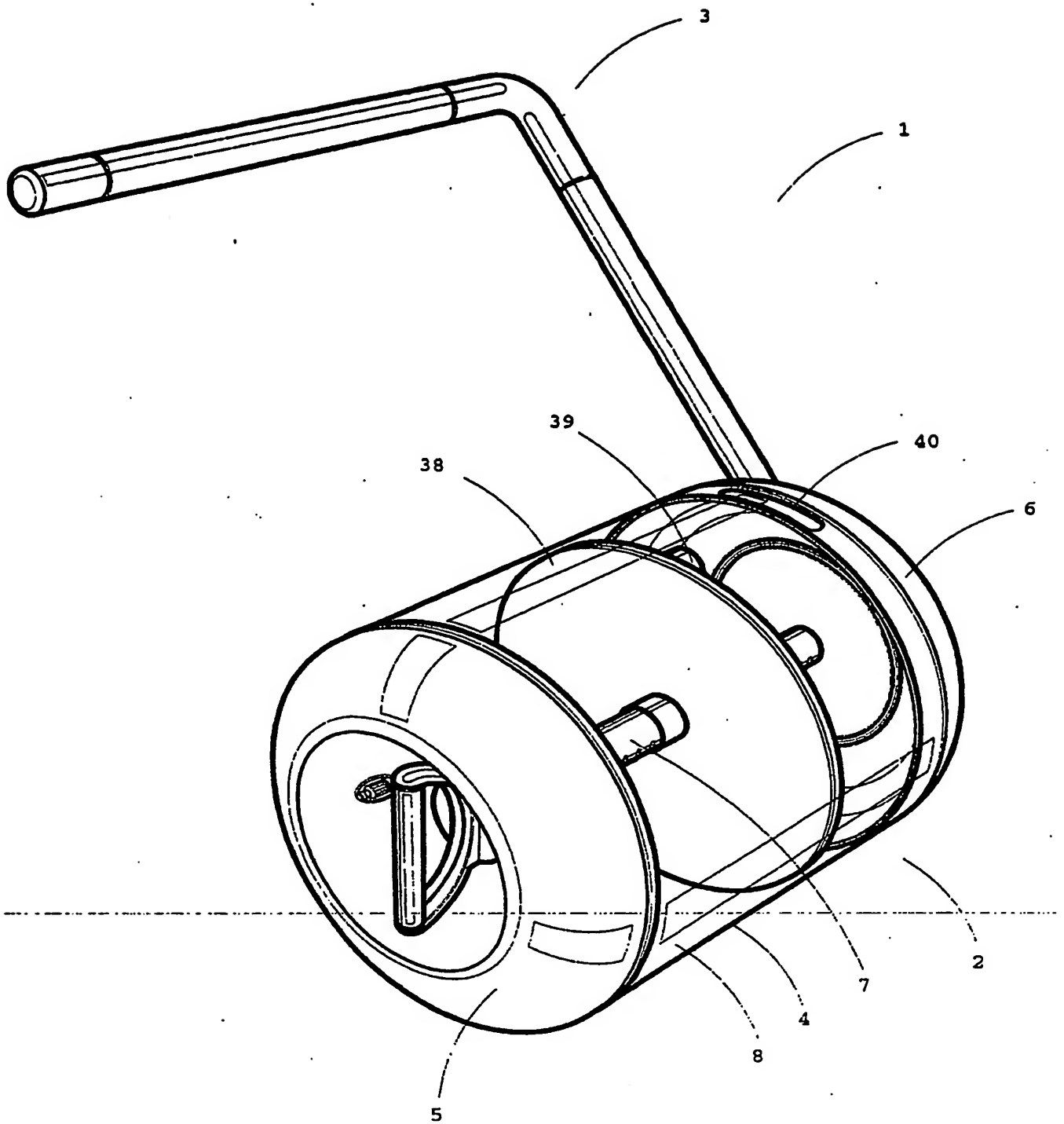


Figure 7

9/15

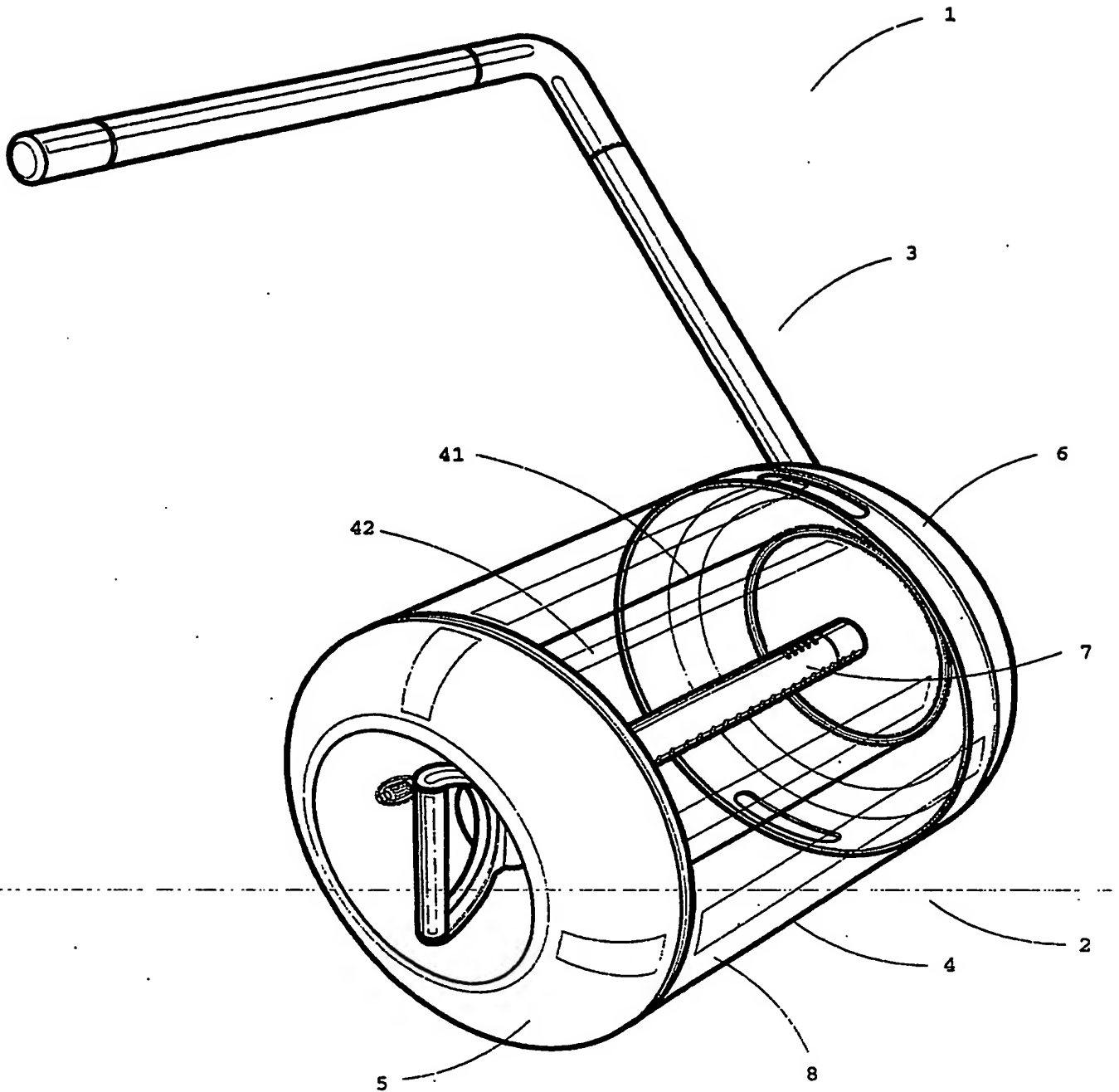


Figure 9

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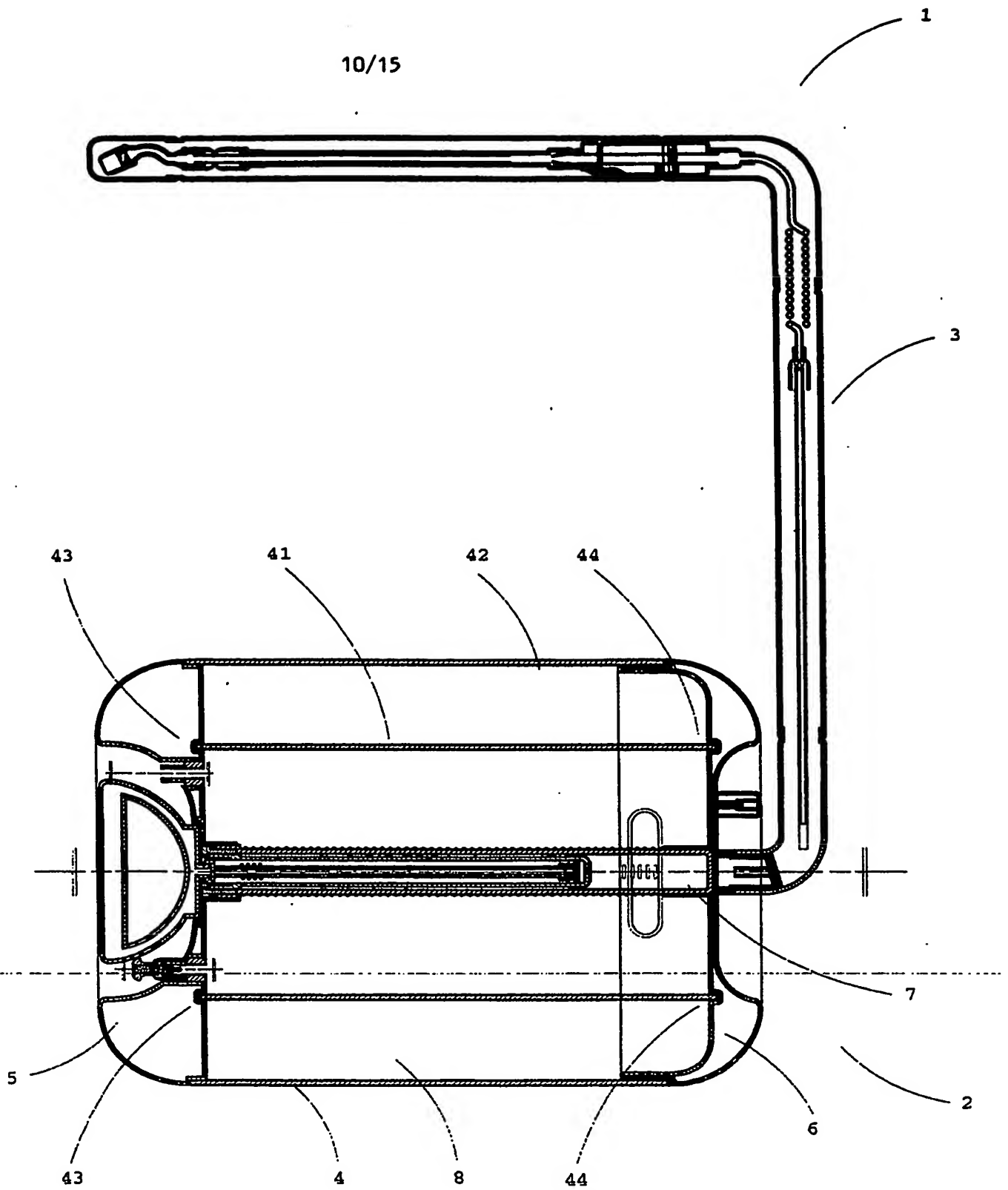


Figure 10

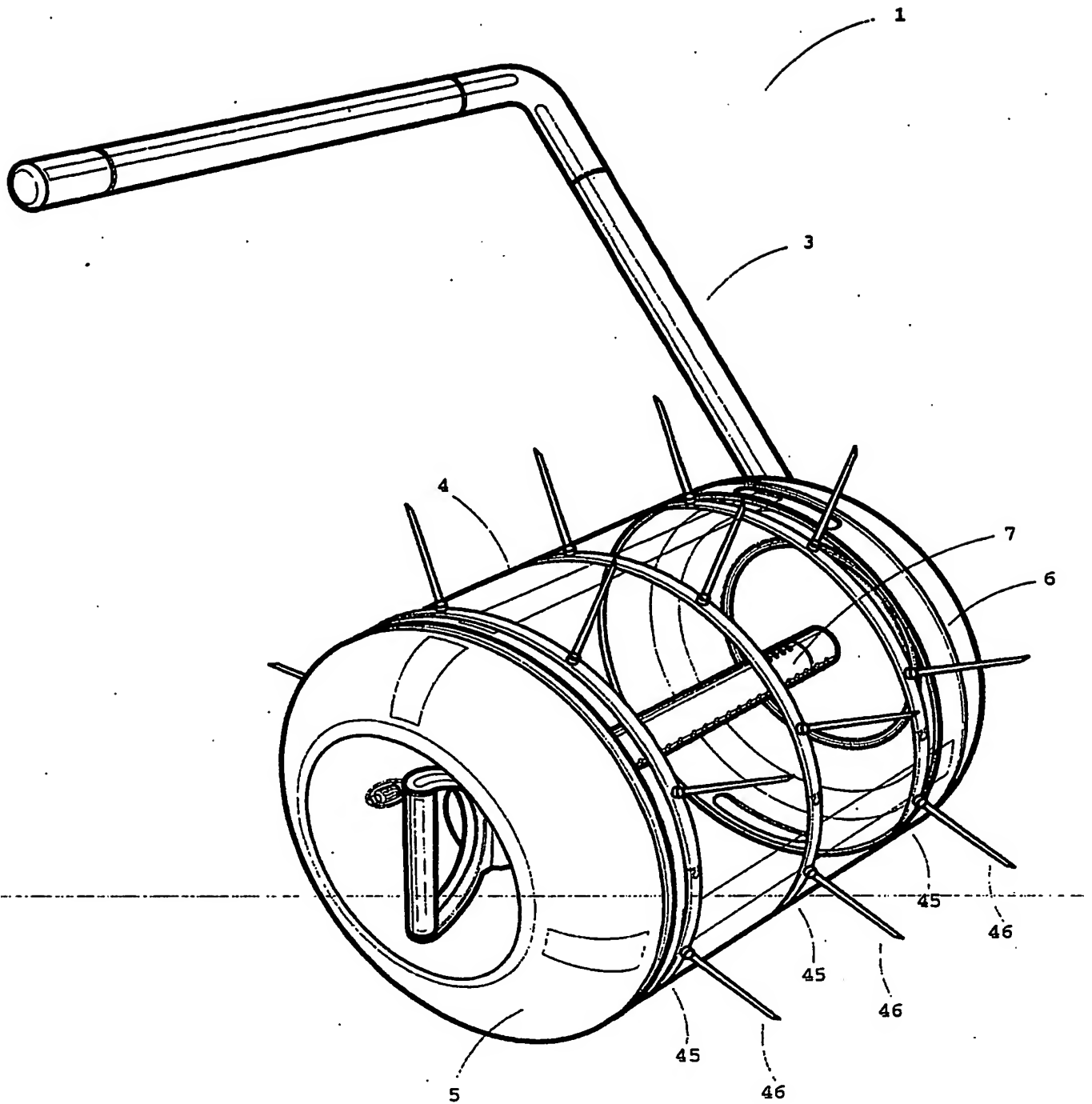


Figure 11

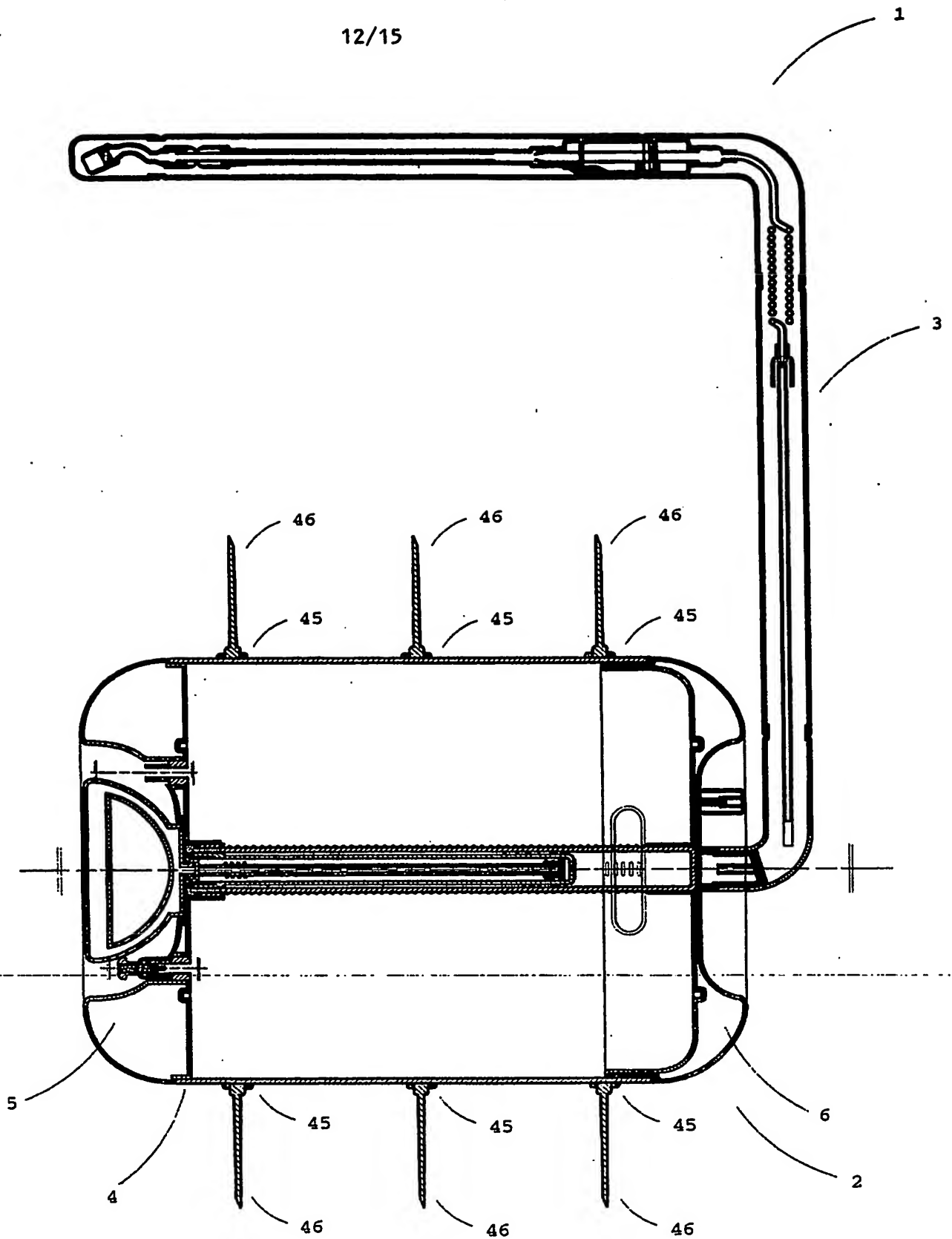


Figure 12

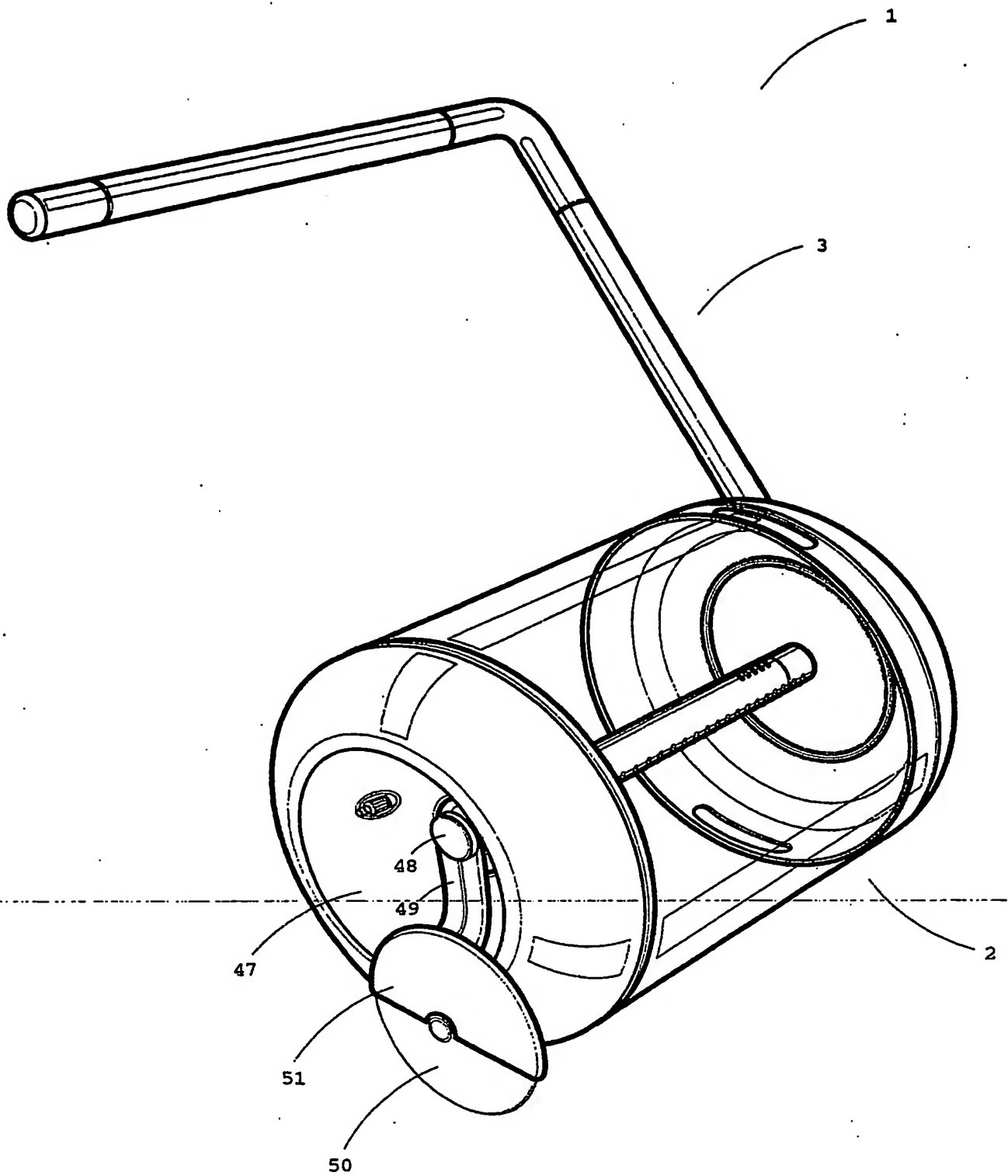


Figure 13

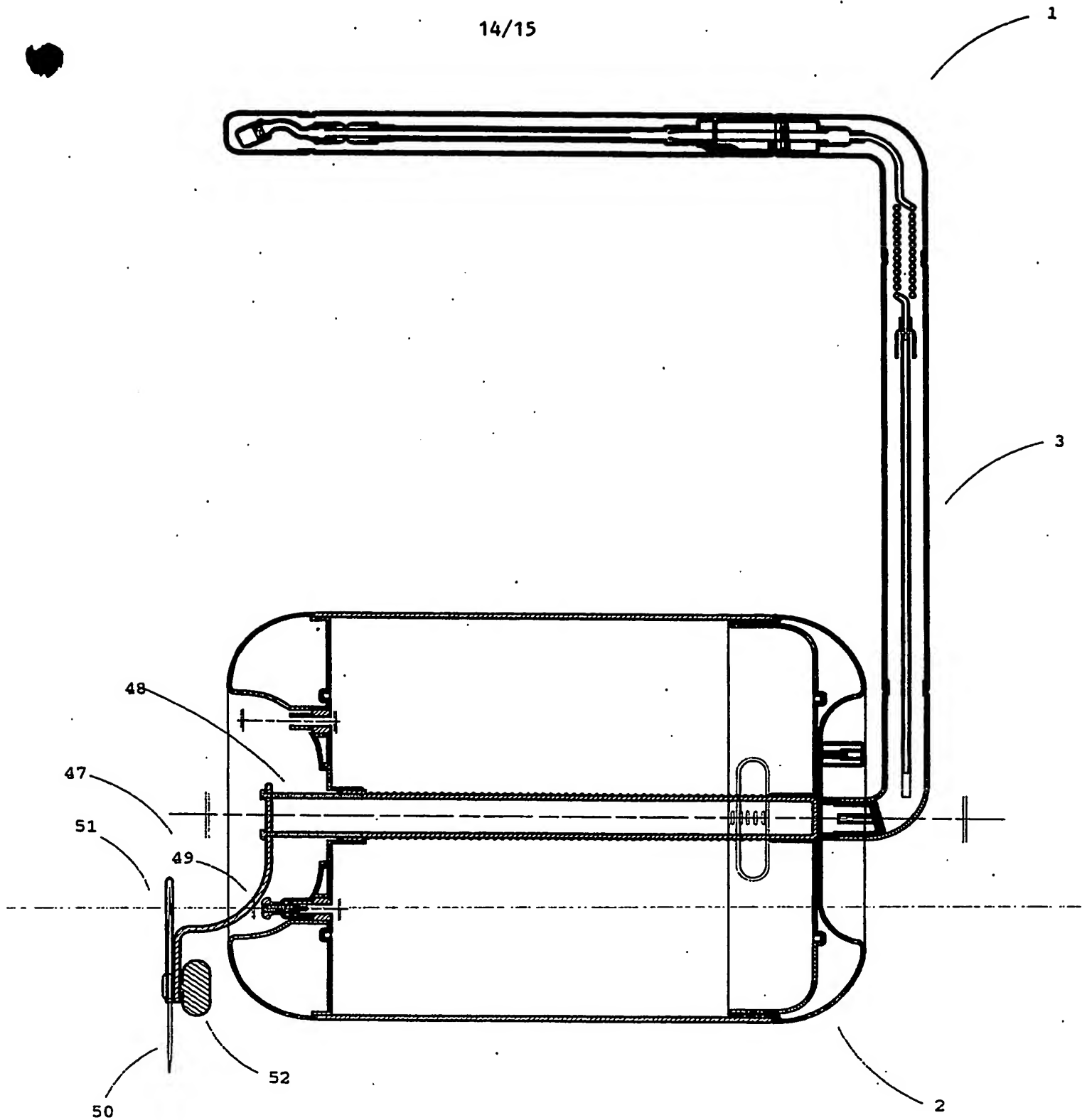


Figure 14

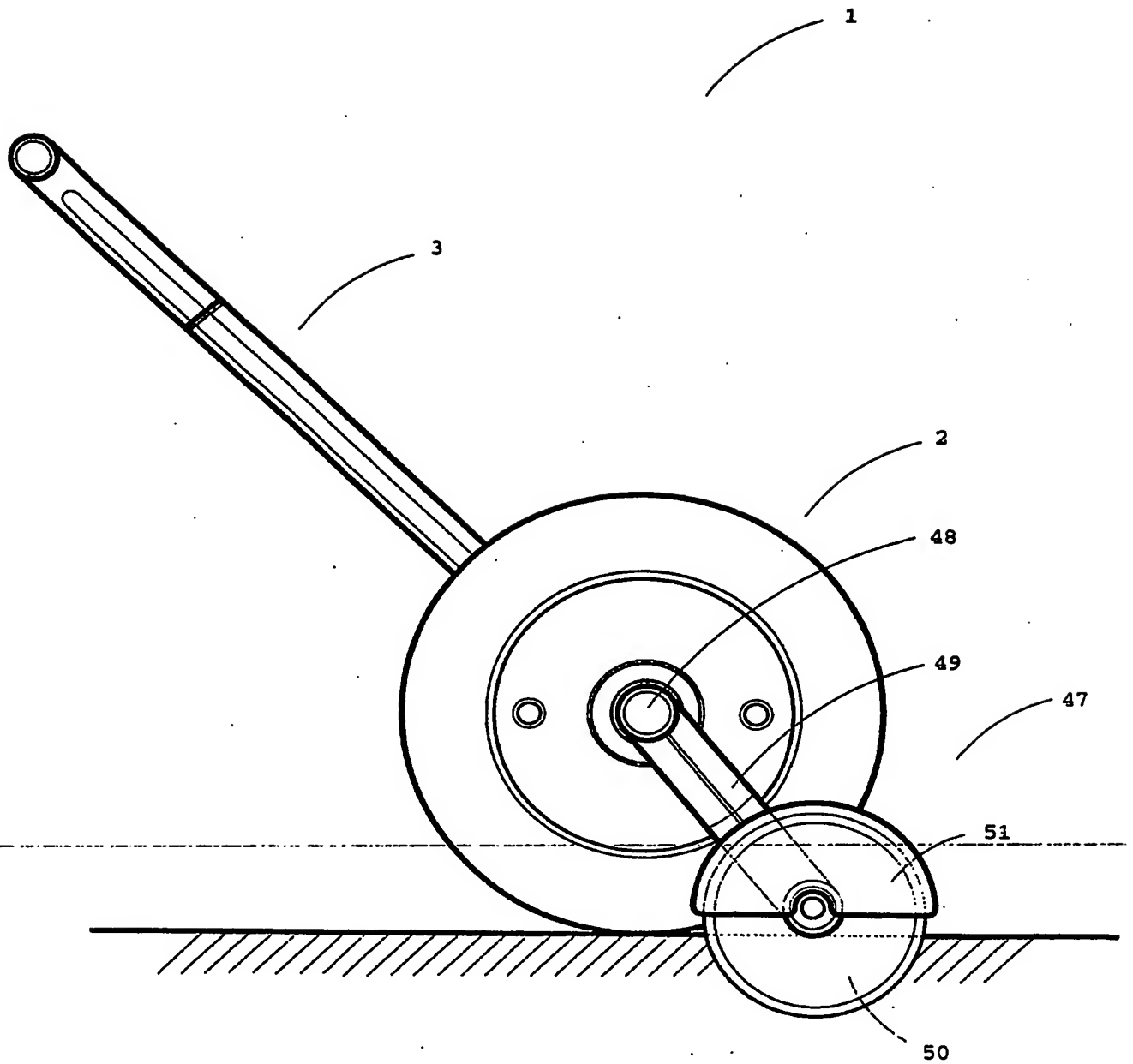


Figure 15

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